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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/661,287	09/12/2003	Feng Chen	TI-35766 (032350.B524)	7460
23494	7590	04/13/2004	EXAMINER	
TEXAS INSTRUMENTS INCORPORATED P O BOX 655474, M/S 3999 DALLAS, TX 75265			WILLIAMS, HOWARD L	
			ART UNIT	PAPER NUMBER
			2819	
DATE MAILED: 04/13/2004				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/661,287	Applicant(s) CHEN, FENG	
	Examiner Howard L. Williams	Art Unit 2819	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) 18-20 is/are allowed.
- 6) ☒ Claim(s) 1-4, 6-12 and 14-17 is/are rejected.
- 7) ☐ Claim(s) 5 and 13 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>091203</u> . | 6) <input type="checkbox"/> Other: ____ |

The disclosure is objected to because of the following informalities: The specification does not describe how applicant manipulates the explicitly shown (page 12 lines 9-25) first order transfer function to obtain a second order transfer function. The passive circuit depicted does not provide a third order transfer function, i.e. a first order and a second order ($S * S^2 = S^3$). Additionally, the drawings do not illustrate a third-order filter. Appropriate correction is required. No new matter may be added.

Claims 1-20 are objected to because of the following informalities: The claimed passive filter providing a first order and a second order filter is not commensurate with the description. Appropriate correction is required.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-4, 6-12, and 14-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Benabes et al. article (*Passive sigma-delta converter design*) in view of the Chen et al. article (*A 0.25 mW 13 b passive $\Sigma\Delta$ modulator for a 10 MHz IF input*) and Yamakido et al. (US 5,227,795) or Voorman et al. (US 5,103,228). Benabes et al. article *Passive Sigma-Delta Converters Design* discloses a delta-sigma ADC with a continuous time passive filter (fig. 3 page 471). Benabes et al. also discloses a discrete time feedback circuit via the DAC shown in figure 1 (page 469). Benabes et al. shows in figure 2 a model of the feedback loop, input is taken as zero for figure 2, shown as a switch and hold element which is seen as reasonably suggestive of a capacitor for the hold element. Chen et al. discloses use of passive filtering delta-sigma ADC using switched capacitors in the feedback loop. Use of switched capacitor as the DAC feedback element in Benabes would have been obvious to provide a simple and compact DAC and the use of RC passive filters would provide reduced switching noise.

Benabes et al. and Chen et al. don't specify whether the respective input signals are a voltage or a current signal so they don't disclose a transconductance element.

Yamakido et al. and Voorman et al. disclose transconductance elements (V-I) to provide a current for summing with the feedback signal. The inclusion of a transconductance element in Benabes et al. would have been obvious because current summing is faster and more simply implemented than voltage summing.


Claims 5 and 13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form to overcome the objections and include all of the limitations of the base claim and any intervening claims.

Claims 18-20 would be allowable if claim 18 were rewritten to overcome the claim objection above.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Vander Zwan et al. (US 6,404,367) and Rich (US 4,860,012) disclose delta-sigma ADC using continuous time loop filters.

Any inquiry concerning this communication should be directed to Howard L. Williams at telephone number 571.272.1815. The Patent and Trademark Office has a new central facsimile number for application specific correspondence intended for entry, it is 703-872-9306.

02 April 2004
Voice 571.272.1815


Howard L. Williams
Primary Examiner
Art Unit 2819